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angle (Ex. 26–125); Plane right triangles (Ex. 126–150); Problems involving the solution of plane right triangles (Ex. 151–305); Identities involving more than one angle. Inverse functions, etc. (Ex. 306–525); Plane oblique triangles (Ex. 526–550); Problems involving the solution of plane oblique triangles (Ex. 551–625); Problems involving areas, altitudes, etc., of triangles, and the radii of circles related to a triangle (Ex. 626–700); Trigonometric equations (Ex. 701–800); Spherical right triangles, and quadrantal triangles, and applications (Ex. 801–870); Formulas of spherical triangles (Ex. 871–900); Spherical oblique triangles and applications (Ex. 901–950).

Exercises 950–1,000 are of a miscellaneous character. Answers to all the exercises are given at the end of the book.

W. H. Bussey.

The Theory of Numbers. By R. D. Carmichael. John Wiley & Sons, New York, 1914. 94 pages. $1.00.

This little volume (No. 13 of the "Mathematical Monographs" edited by M. Merriman and R. L. Woodward) contains in the first seventy-five pages an excellent introduction to the classical multiplicative theory of numbers, while an additional chapter of seventeen pages gives a brief account of the meaning of some advanced topics, such as Fermat's Last Theorem, Theory of Quadratic Residues and Galois' Imaginaries, all of which are too technical for a detailed treatment in a short introductory book.

The volume would seem to the reviewer to be particularly valuable for self-study. Any reader who will thoroughly master it will have gained a clear idea of the fundamental questions of the theory, and will be well prepared for the study of more complete or more advanced treatises.

A valuable feature is the list of 84 problems which are distributed among the various chapters. Many of these are of interest in themselves, and their careful study will do much to make the abstract theory gain a concrete meaning.

The titles of the chapters will serve to indicate the subjects treated:

(1) Elementary properties of integers. (2) On the indicator of an integer. (3) Elementary properties of congruences. (4) The theorems of Fermat and Wilson. (5) Primitive roots modulo m. (6) Other topics.

The last chapter is the only one where references are given. Although the first five chapters are quite self-contained, an occasional reference would be useful, even to readers familiar with the subject. For example, the proof of Wilson's theorem, as given on p. 50, while it may be well known, is new to the reviewer. On pages 50–51 it might well be stated in connection with Wilson's theorem (although commonly omitted in books on number-theory) that the trivial congruences:

$$(n-1)! \not\equiv 0 \text{ mod. } n, \text{ for } n \text{ prime},$$

$$(n-1)! \equiv 0 \text{ mod. } n, \text{ for } n \text{ not prime}, n > 4,$$

furnish also a complete test for prime numbers.

The following misprints and slips were noticed:
p. 14, last formula: read $(mnp + n\alpha + m\beta)$ for $(mnp + \alpha + \beta)$;
p. 22, last line: read $0 \leqq b_i < n$ for $0 < b_i < n$;
p. 28, exercise 8: read " is " for " as ";
p. 93, Index: read " Primitive ϕ-roots " for " Primitive ψ-roots."
In p. 29, line 2, the word " simplest " may be a little misleading.

The author is to be congratulated on his happy selection of material which permits him, in this small volume, to give a clear insight into the methods employed in elementary number-theory, as well as to present in a well-connected fashion the principal results.

A. J. KEMPNER.

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Trigonometry. By MAXIME BÔCHER and HARRY DAVIS GAYLORD. New York, Henry Holt and Company, 1914. ix + 142 pp.

The authors have stated in the preface that "this text-book has been prepared with a view to giving an adequate treatment of what is essential, in a form sufficiently concise so that the real simplicity and brevity of the subject may be in evidence," and that "the number of principles involved is very limited and should not be artificially multiplied by the formulation of rules." This ought to be the aim of every text-book on elementary trigonometry, but mathematicians will differ in their opinions as to what constitutes real simplicity and brevity. In reviewing this text its object must be kept in mind. We must also not overlook the fact, implied in the preface, that the text is not intended primarily for college classes, but also for beginners in the subject.

Chapter I, covering 19 pages, after defining the six trigonometric functions for acute angles, etc., treats among others the following topics: the use of trigonometric tables, solution of right triangles, projections of line segments, line values and the variation of trigonometric functions for angles of the first quadrant, simple trigonometric identities and the solution of easy trigonometric equations.

Chapter II introduces the student to logarithms. The logarithm of a number is first defined for the base 10, and the four fundamental principles are derived for logarithms of this base. In a subsequent section, in small type, the logarithm of a number is defined for any base, and the formula for the change of base is given, the method of derivation being indicated by a numerical example. Throughout the text the logarithms of numbers less than unity are written with negative characteristics and positive mantissas, the usual method being mentioned on page 25. The co-logarithm is used extensively. A student who uses the rule for the logarithm of a quotient and does not use co-logarithms, will find himself confronted with an expression of the type, $\bar{4}.42357 - \bar{3}.96284$, which the text does not adequately consider.

Chapter III devotes 24 pages to the consideration of the topics: directed angles of any magnitude, directed line segments, the trigonometric functions of angles of any magnitude, etc., closing with a few examples in trigonometric identities, the solution of trigonometric equations and a brief note on inverse